

News Release –

***(Fort Lee Partnership with the Virginia Department of Environmental Quality:
Bailey Creek Baseline Environmental Survey)***

By Angela Lea McCorkle

In this era of downsizing and outsourcing at installations, partnerships are more important than ever. Partnering fosters a clear sense of mission among all participants, and promotes appropriate empowerment, delegation, and assumption of responsibility among stakeholders. Mr. Hank Hennigar, a contractor who manages Fort Lee's Installation Restoration Program (IRP), approached the Virginia Department of Environmental Quality (DEQ) and the U.S. Army Corps of Engineers (USACE) on behalf of Fort Lee about partnering on a baseline environmental survey for Bailey Creek. Fort Lee and the Virginia DEQ have successfully partnered in the past.

Bailey Creek originates in the main cantonment area of Fort Lee and travels approximately 2.8 miles to Fort Lee's boundary before it eventually empties into the James River, a major tributary of the Chesapeake Bay. Bailey Creek drains approximately 2,532 acres within Fort Lee and also receives most of the stormwater runoff from the installation. The land surrounding Bailey Creek ranges from highly developed areas with large portions of impervious surfaces and rapid runoff to forested areas with little runoff. Within Fort Lee, Bailey Creek has three distinct segments. The upper segment, or headwater of Bailey Creek, is heavily wooded and undeveloped with sluggish stream flow. The middle segment is characteristic of a stream in transition with increasing stream flow and velocity. Sediment loading, due to an increase in stormwater runoff into Bailey Creek, also increases in the middle segment. The lower segment receives large amounts of stormwater runoff as it drains the main post.

The objective of the baseline survey was to determine the overall environmental quality of Bailey Creek through an assessment of landscape ecology, biological inventory, and the physical and chemical nature of the drainage basin. The study was performed in support of an investigation of several contaminated IRP sites within the Bailey Creek watershed. The study was designed to determine if the nearby IRP sites were impacting Bailey Creek and also to determine

the effect of stormwater runoff on Bailey Creek. This baseline survey evaluated the potential contamination at each IRP site and the cumulative effects of all the IRP sites. In addition to determining the presence and extent of contamination of selected chemical components in the sediments and water column of Bailey Creek, the survey assessed the quality of indicator aquatic biological communities and aquatic plant and animal diversity and distribution. The baseline survey also looked at the drainage characteristics of the Bailey Creek watershed. A 24-hour, 2-inch rainfall was simulated which showed that a similar rain event would significantly increase the stream flow in Bailey Creek, due in part, to the heavily developed, impervious areas on the installation which drain into Bailey Creek. This model illustrated that significant amounts of runoff travel through Bailey Creek during rain events.

Under contract to Fort Lee, scientists at Virginia Commonwealth University conducted a biological assessment of Bailey Creek using the Rapid Bioassessment Protocols developed by the EPA for use in streams and rivers. The assessment concluded that the continual pulsing of stormwater through the creek system was reducing the optimal habitat for macroinvertebrate and fish communities in the lower and middle segments of Bailey. The habitat assessment scores for Bailey Creek were considered to be at the borderline of “supportive” or “partially supportive” for healthy biological communities. A fish community assessment showed poor species richness and diversity. Most of the fish species found in Bailey Creek were classified as tolerant species, characteristic of moderately stressed systems. Each biological station along Bailey Creek showed evidence of considerable sediment loading.

At the recommendation of the Virginia DEQ, freshwater clams (*Corbicula ssp.*) were used in the survey as an indicator of water quality because they are filter feeders that filter particulates from the water column. Clams were obtained from clean streams and examined to determine their current conditions prior to being placed in the live boxes. Prior to placement, the clams were also sorted by size classes. Each live box contained an equal number of clams from each size class. Live boxes containing 100-200 clams were placed at six biological stations along the length of Bailey Creek.

Sites for the live boxes were carefully selected by Fort Lee and the Virginia DEQ to obtain representative data for all drainage areas on Fort Lee. None of the stations were beyond Fort Lee's boundary. After approximately one month in Bailey Creek, the clams were collected and their tissue analyzed for a variety of organic and inorganic constituents. When compared with analyses of clams obtained from known clean water, the results of the analyses indicated that there are several organic compounds in the Bailey Creek system. Extremely low levels of Dichlorodiphenyl dichloroethane (DDE), a breakdown product of the insecticide DDT, was one of the organic compounds detected, as was bis (2-ethylhexyl) phthalate. These compounds were not detected in water column samples, but were present in sediment samples. Three metals (iron, nickel, and zinc) were also detected above the background sample levels.

Fish tissue samples were collected from various locations along the length of Bailey Creek and were analyzed for the same constituents. The creek chub (*Semotilus atrocaculatus*) has a very small home range (less than 100 meters of stream), and was considered to be a good indicator of fish body burden information within a limited area. In addition, fish have a more elaborate detoxifying system than clams, so they are able to metabolize contaminants more efficiently. Data from fish tissue results were similar to those obtained from Corbicula clams.

The Baseline Environmental Study indicated that several organic compounds and metals are being accumulated by biological communities, albeit at very low levels. It also concluded that there did not appear to be any significant chemical stressors in the surface water or sediments related to any of the IRP sites located in the Bailey Creek drainage area. The principal stressor of Bailey Creek was found to be stormwater runoff and high sediment loading. Recommendations from this study have been incorporated into the design of future construction projects.

Fort Lee's Natural Resources Department is building upon the Bailey Creek Baseline Environmental Survey and is currently working on securing funding to implement the recommendations identified. Specific recommendations include reducing the impervious surface on the installation to reduce the amount of water entering Bailey Creek and utilizing best management practices to reduce the amount of sediment that enters Bailey Creek. In order to

reduce the amount of stormwater entering Bailey Creek, Fort Lee is taking steps to ensure that each new construction project has a plan to reduce runoff.

Each partner contributed to the success of the study. The USACE, Baltimore District provided an efficient contract vehicle, project oversight, and reviewed the work plan. The Virginia DEQ helped to identify sample locations, assisted with design considerations, suggested survey organisms for the water study, provided information on similar studies, and helped develop the work plan. Devlin Harris, a Senior Environmental Engineer with the Federal Facilities Program at the Virginia DEQ, said “the Bailey Creek Baseline Environmental Survey was a good way to get a base-wide ecological background study”. Another important factor in this successful partnership was the work of Fluor Daniel GTI, the contractor that conducted the field investigation. Fluor Daniel GTI collected and analyzed sediment, surface water, and biota samples from Bailey Creek and performed the non-aquatic survey and habitat assessment.

Partnering was found to be a very effective tool because it can be used to meet both groups' goals. Partnering saved Fort Lee a lot of time and money. It is only through partnering that this information could be collected in a timely manner. The partnership formed with the Virginia DEQ helped clarify priorities and anticipated potential problems. In addition, because of previous partnerships, open communication, and the sharing of information between Fort Lee and Virginia DEQ, a level of trust has been established.

Partnering does not have to be a formal procedure overseen by mediators or one that follows a complex set of written regulations. The Fort Lee IRP Program and the Virginia DEQ Federal Facilities Program have a very effective informal partnership agreement. They communicate regularly via email or phone and they have helped to establish other contacts and other partnerships. Stemming from this partnership, contacts have been made with the Virginia Department of Conservation and Recreation, which plans to help Fort Lee with planning and design regarding better stormwater controls using the recommendations identified in the Bailey Creek baseline survey. Successful partnerships are key in integrating an installation's environmental program. Fort Lee could not have conducted this project without the help of the Virginia DEQ.

